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(56) Documents cited

GB 1396158 A GB 1367192 A

(58) Field of search

UK CL (Edition L) B7B BSB

INT CL⁵ B60R

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(54) An air bag device for the knees of an occupant of a vehicle

(57) An air bag device for the knees of an occupant of a vehicle. The air bag 26 has a transversely elongated flat shape and is mounted on a retainer 24 which is elongated about the righthand and lefthand sides of a steering column. An inflator 25 is disposed to one side of the steering column, an opening 30 in the instrument panel 10 permitting gas flow into the bag.

FIG.3

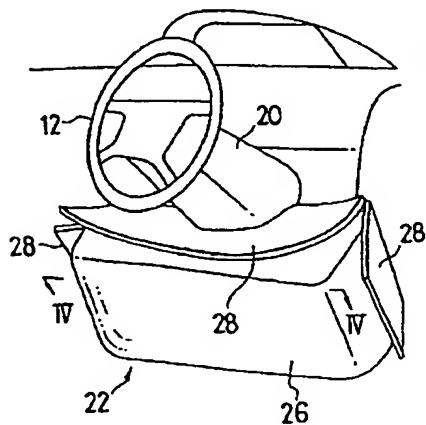
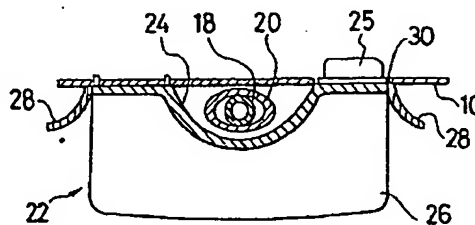


FIG.4



GB 2 263 671 A

1/2

FIG.1

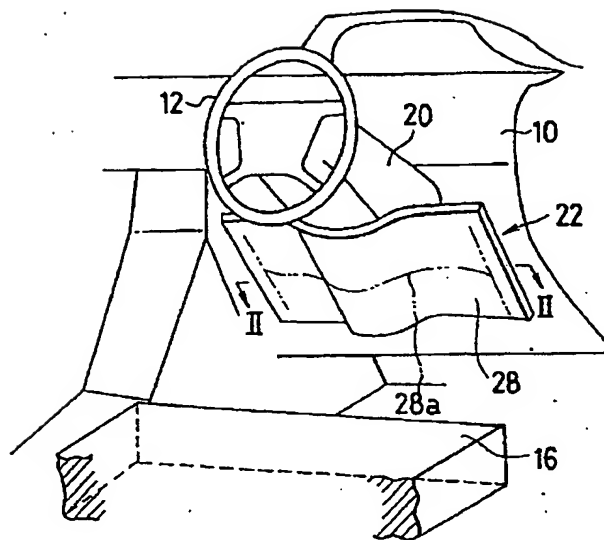
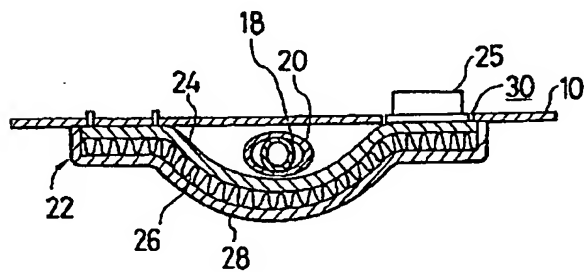


FIG.2



2/2

FIG. 3

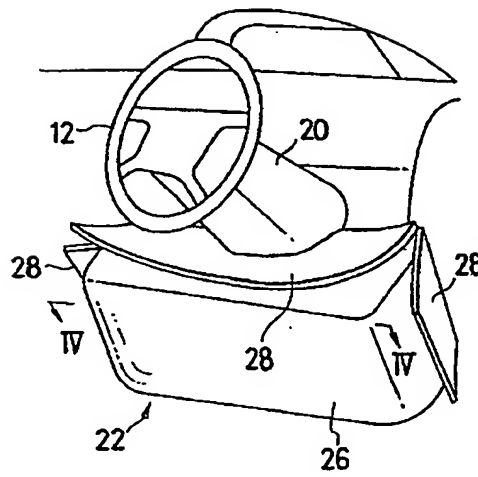
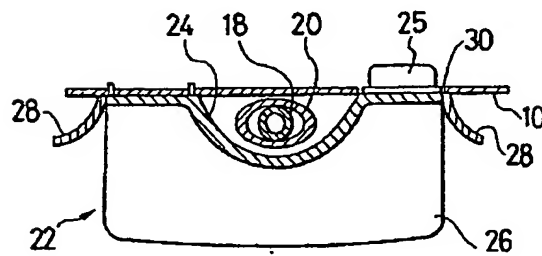


FIG. 4



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S P E C I F I C A T I O N

TITLE OF THE INVENTION

Air Bag Device for the Knees of an Occupant

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a device for protecting an occupant of a vehicle and, more particularly, to an air bag device for the knees of an occupant as called a "knee bag device".

Description of the Related Art

An occupant protecting device having an air bag (or a knee bag) to be extended in front of the knees of the occupant of a vehicle is disclosed in Japanese Utility Model Publication No. 24110/1972 and Japanese Patent Laid-Open No. 28050/1991. This knee bag can be extended to protect the lower half of the occupant by preventing the submarine motion of the occupant (i.e., the motion of the occupant's body into the front lower portion of the seat).

The occupant protecting devices, as known in the above-specified individual publications, have

their air bag devices arranged in front of the center of the seat. As a result, the air bag device is positioned near the knees of the occupant to raise a problem of lowering the comfort of the vehicle cabin.

OBJECT AND SUMMARY OF THE INVENTION

An object of the present invention is to provide an air bag device for the knees of an occupant, which can retain a wide space in a vehicle cabin.

An air bag device of the present invention comprises an air bag adapted to be extended in front of a seat of a vehicle including a zone at a height of the seat. The air bag device has a transversely elongated flat shape. The device is elongated about the righthand and lefthand sides of a steering column.

According to the present invention, the air bag device is thinned, so that the knees of the occupant are far away from the air bag device. Namely, there is a wide space around the occupant's knees.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing the cabin inside of a vehicle, which is equipped with an air bag

device for a knee of an occupant of a vehicle according to an embodiment of the present invention;

Fig. 2 is a section taken along line II - II of Fig. 1;

Fig. 3 is a perspective view showing the cabin inside when an air bag is extended; and

Fig. 4 is a section taken along line IV - IV of Fig. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

An embodiment of the present invention will be described in the following with reference to Figs. 1 to 4.

An instrument panel 10, a steering wheel 12 and a seat 16 are provided in a cabin of a vehicle. The steering wheel 12 is attached to the leading end of a steering column 18 (as shown in Fig. 2), which is covered with a column cover 20. A transversely elongated flat air bag device 22 is attached to the instrument panel 10 such that it is elongated about the righthand and lefthand sides of the column cover 20.

As clearly seen from Fig. 2, the air bag device 22 is constructed to include a retainer (or mounting plate) 24, an inflator (or gas generator) 25 attached

to the retainer 24, an air bag 26 attached to the retainer 24 and adapted to be extended by the gases discharged from the inflater 25, and a module cover 28 covering the air bag 26. The retainer 24 is formed with an opening for admitting the gases from the inflater 25, which in turn is fixed to the peripheral edge of the opening. The module cover 28 has its peripheral edge fastened firmly to the peripheral edge of the retainer 24 by means of rivets. The module cover 28 is formed with tear lines 28a, along which the module cover 28 is torn when the air bag 26 is extended. In the present embodiment, the air bag device 22 thus constructed is shaped to have its transverse center portion slightly curved forward to conceal the aforementioned column cover 20 at its back.

The instrument panel 10 is formed with an opening 30, in which is mounted the inflater 25 to further reduce the forward projection of the air bag device 22. The gas inlet of the air bag 26 has its peripheral edge attached to that of the opening in the retainer 24.

When the air bag device for the knee is accelerated with a high forward acceleration at a collision or the like of the vehicle, the inflater 25 is energized to extend the

air bag 26 in response to a signal coming from an acceleration sensor (not shown). Then, the module cover 28 is torn by the pushing force of the air bag 26 being extended, as shown in Figs. 3 and 4, so that the air bag 26 is extended in front of the seat 16 including a zone at a height of the seating face of the seat 16. As a result, the occupant on the seat 16 has his or her legs protected by the extended air bag 26 even if the legs move forward at a collision of the vehicle.

As shown in Figs. 1 and 2, the air bag device 22 is so flattened that there is a wide space around the legs of the occupant on the seat 16. Thus, an excellent degree of comfort is achieved in the vehicle cabin.

Although the above device is equipped with only one inflator 25, it may have two or more inflators.

As has been described hereinbefore, according to the air bag device for the knees of a vehicle occupant of the present invention, the air bag device has such a small thickness that there is a wide space around the legs of an occupant, which enhances the comfort of the cabin. Since the air bag is transversely widened in front of a seat, it can be easily extended uniformly and rapidly to the right and left of the forward zone of the seat.

WHAT IS CLAIMED IS:

1. An air bag device for the knees of an occupant of a vehicle comprising an air bag adapted to be extended in front of a seat of the vehicle including a zone at a height of the seat characterized in that said device has a transversely elongated flat shape, and that said device is elongated about the righthand and lefthand sides of a steering column.

2. An air bag device for the knees of an occupant of a vehicle, comprising

a retainer covering a steering column cover of the vehicle and an instrument panel of the vehicle about the righthand and lefthand sides of the steering column cover;

an opening formed in said retainer for admitting gases;

an air bag folded along said retainer having a gas admitting opening attached at a peripheral edge thereof to a peripheral edge of said opening of said retainer;

a module cover covering said air bag and having a peripheral edge thereof attached to that of said retainer; and

an inflator for generating gases attached to said peripheral edge of the opening of said retainer,

whereby said air bag is extended to the front of the knees of the occupant by the gases of said inflater when the vehicle collides.

3. An air bag device according to claim 2, wherein said retainer is curved to have a recess for receiving said steering column.

4. An air bag device according to claim 2, wherein the instrument panel has an opening for receiving said inflater thereby to reduce the projection of the air bag device from the instrument panel.

5. An air bag device according to claim 2, wherein said module cover is formed with tear lines, along which it is torn when said air bag is extended.

6. An air bag device for the knees of an occupant substantially as hereinbefore described with reference to the accompanying description and Figures 1 to 4 of the drawings.

-8-

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number
GB 9300385.3

Relevant Technical fields

(i) UK CI (Edition L) B7B (BSB)

(ii) Int CI (Edition 5) B60R

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Search Examiner

PAT EVERETT

Date of Search

22 FEBRUARY 1993

Documents considered relevant following a search in respect of claims ALL

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1396158 A (EATON) Figures 1 and 3 note bag 16	1
X	GB 1367132 A (NISSAN) note bag 19	1

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Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

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A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

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